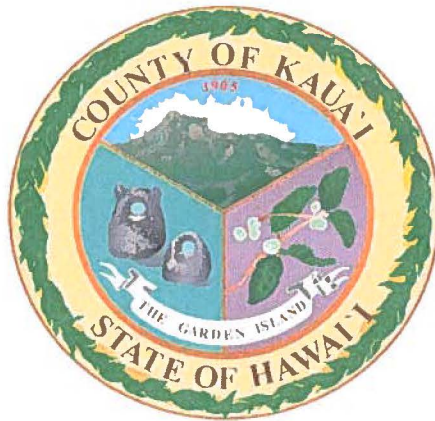


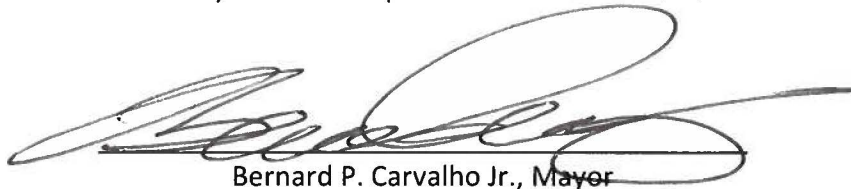
# County of Kauaʻi

# Street Design Manual

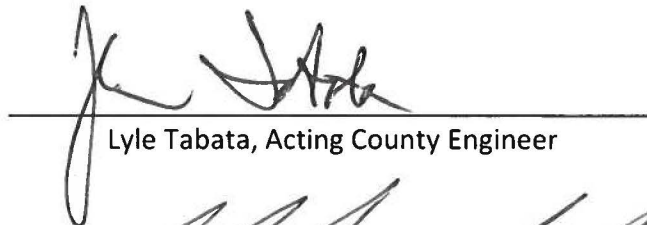


October 30, 2018

County of Kauaʻi Department of Public Works

A large, stylized handwritten signature in black ink, consisting of several loops and a long horizontal stroke at the end.

Bernard P. Carvalho Jr., Mayor

A handwritten signature in black ink, featuring a large 'L' and 'T' followed by a horizontal line.

Lyle Tabata, Acting County Engineer

A handwritten signature in black ink, featuring a large 'M' and 'M' followed by a horizontal line.

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(<http://www.modelstreetdesignmanual.com/index.html>)

After further consideration, this *Street Design Manual* was simplified to better meet the needs of the County.

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## Chapter 1: Introduction

### Background

In 2009, the State of Hawai'i adopted Act 054 (Hawai'i Revised Statutes Section 264-20.5), which requires counties within the State to:

*“adopt a complete streets policy that seeks to reasonably accommodate convenient access and mobility for all users of the public highways within their respective jurisdictions...including pedestrians, bicyclists, transit users, motorists, and persons of all ages and abilities...”*

In 2010, the County of Kaua'i became the first county in Hawai'i to adopt a Complete Streets Resolution. Resolution number 2010-48 requires:

*“that all roadway projects, including, design, planning, reconstruction, rehabilitation, maintenance, or operations in the County of Kaua'i be balanced and equitable in accommodating and encouraging travel by bicyclists, public transportation vehicles and their passengers, and pedestrians of all ages and abilities in accordance with Complete Streets principles.”*

In addition, Resolution 2010-48 calls for the County of Kaua'i to:

*“plan for, design, and construct new County transportation improvement projects in accordance with Complete Streets principles in order to safely accommodate travel by pedestrians, bicyclists, public transit, and motorized vehicles, with special priority given to pedestrian travel in town centers and other densely populated areas...”*

and to include:

*“Complete Streets principles in the development and construction standards within the Kaua'i County Code.”*

The Resolution also states:

*“that the County of Kaua'i should include Complete Streets policies and principles in future General Plan, development plan, and special area plan updates.”*

This manual is a step in the implementation of the County of Kaua'i Complete Streets Resolution, as it serves as a design guide for street design, and modifies County of Kaua'i roadway design standards. It supports complete streets policies found in the Kaua'i Multimodal Land Transportation Plan and recently completed Community (formerly called Development) Plans.

## **Benefits of a Complete Streets approach**

In the past, streets have been designed for primarily one user: the automobile. With such an approach, streets are frequently unsafe or uninviting for other users, such as pedestrians and bicyclists. Complete Streets takes a different approach, emphasizing that streets are an important element of our public realm, and that streets are for everyone. Streets should be designed for all users, including autos, freight, emergency and service vehicles, transit, bicyclists and pedestrians. The many benefits of complete streets have been demonstrated, and include the following:

- Increased safety for all users.
- Improved personal health by encouraging “active” transportation, such as walking and bicycling.
- Improved transportation choice for all segments of the population, especially keiki and kupuna.
- Ability for kupuna to live independently even when driving is no longer an option.
- Ability for keiki to walk independently to school and safely explore their neighborhoods.
- Improved access for people with disabilities.
- Reduced per capita health costs.
- Reduced per capita transportation costs.
- Strengthened neighborhoods through enhanced socialization.
- Vitalized town centers and commercial districts.
- Reduced public health costs through reductions in disease.
- Reduced long-term public capital costs through reductions in expensive widening projects.
- Enhanced environmental quality through alternative stormwater management and reduced impermeable pavements.
- Reductions in greenhouse gas emissions.
- Support of community history, culture and character.

A Complete streets approach does not require or mandate that people change their modes of transportation. Rather, it offers transportation choices for everyone, and increases access for those who are unable to drive for physical or socio-economic reasons.

Complete streets is not a “one-size fits all” or “cookie cutter” approach. Rather, streets are designed for their environmental, cultural, and historic context. Complete streets support and enhance local community character. (See Chapter 7 for the community design process.)

## **Current Design Standards**

The County’s Standard Details for Public Works Construction were last updated in 1984. County Road Standards were established in 1972. As such, the roadway standards and details do not reflect current best practices for roadway design.



This manual replaces County Standard Details R-27, R-41, and R-42, and the County Road Standards, in compliance with Resolution 2010-48. (See Chapters 2, 3 and 4 for referenced roadway standards, street cross sections, and design parameters.)

## **Purpose**

The purpose of this manual is to:

- Provide simple and straightforward guidance on street design,
- Provide a process for community involvement in street design,
- Update County Standards and Details, and
- Streamline the roadway design and approval process by laying out clear expectations for roadway planning and design.

## **Applicability**

This manual applies to all streets under County jurisdiction, including private roadways that must be designed to County standards, or may be dedicated to the County in the future. It does not apply to roadways under State or Federal jurisdiction, although coordination is strongly encouraged between jurisdictions.

This manual applies to both the design of new roads and the retrofit of existing roads.

This manual is intended for:

- Property owners, developers, and design consultants to understand the County's expectations for roadway design at the onset and throughout project development,
- Planners, designers and engineers of County roadway projects and adjacent land uses to better plan, scope and design projects,
- Plan reviewers and decision-makers to review and evaluate projects based on established standards, and
- Community members, to provide a framework for participation and understanding of street projects.



## Chapter 2: Reference Documents

### Design and Engineering Standards and Guidelines

The County of Kauaʻi uses numerous Federal, State, and County design standards and guidelines when designing roadways. These standards and guidelines are noted below in Table 2-1, and shall be considered and incorporated into roadway design. Where guidelines conflict, or deviation is requested from these accepted guidelines, consult with the Engineering Division of the Department of Public Works.

This list will be reviewed and updated if needed by the Engineering Division. Current editions shall be used for all reference standards.

**TABLE 2-1 STANDARDS AND GUIDELINES**

<b>Document Title Website</b>	<b>Relevance</b>	<b>Publisher</b>
<i>Manual of Uniform Traffic Control Devices (MUTCD)</i> <a href="https://mutcd.fhwa.dot.gov/">https://mutcd.fhwa.dot.gov/</a>	Signage, striping, other traffic control devices	FHWA
<i>A Policy on Geometric Design of Highways and Streets</i> (AASHTO “Green Book”) <a href="https://bookstore.transportation.org/collection_detail.aspx?ID=110">https://bookstore.transportation.org/collection_detail.aspx?ID=110</a>	Roadway design	AASHTO
<i>Guide for the Development of Bicycle Facilities</i> <a href="https://bookstore.transportation.org/collection_detail.aspx?ID=116">https://bookstore.transportation.org/collection_detail.aspx?ID=116</a>	Bike facilities	AASHTO
<i>Guide for the Planning, Design, and Operation of Pedestrian Facilities</i> <a href="https://bookstore.transportation.org/collection_detail.aspx?ID=131">https://bookstore.transportation.org/collection_detail.aspx?ID=131</a>	Pedestrian facilities	AASHTO
<i>Guide for the Geometric Design of Transit Facilities on Highways and Streets</i> <a href="https://bookstore.transportation.org/collection_detail.aspx?ID=133">https://bookstore.transportation.org/collection_detail.aspx?ID=133</a>	Transit design	AASHTO
<i>Urban Street Design Guide</i> <a href="http://nacto.org/publication/urban-street-design-guide/">http://nacto.org/publication/urban-street-design-guide/</a>	Street and intersection design	NACTO
<i>Urban Bikeway Design Guide</i> <a href="http://nacto.org/publication/urban-bikeway-design-guide/">http://nacto.org/publication/urban-bikeway-design-guide/</a>	Bikeway design	NACTO

<b>Document Title Website</b>	<b>Relevance</b>	<b>Publisher</b>
<i>Transit Street Design Guide</i> <a href="http://nacto.org/publication/transit-street-design-guide/">http://nacto.org/publication/transit-street-design-guide/</a>	Bus stops and street design for transit	NACTO
<i>Urban Street Stormwater Guide</i> <a href="http://nacto.org/publication/urban-street-stormwater-guide/">http://nacto.org/publication/urban-street-stormwater-guide/</a>	Stormwater management in street right-of-way	NACTO
"Storm Water Runoff System Manual"	Drainage	COK
Kaua'i County Code <a href="http://qcode.us/codes/kauaicounty/">http://qcode.us/codes/kauaicounty/</a>	Driveways, Access Management, Block Length, Right-of-Way minimum widths, Special Planning Area thoroughfare design	COK
<i>Standard Details for Public Works Construction</i>	Standard construction details	COK
County of Kaua'i Transit Design Guidelines	Transit facility design	COK
<i>Traffic Control Devices Handbook</i> <a href="http://ecommerce.ite.org/IMIS/ItemDetail?iProductCode=IR-112A">http://ecommerce.ite.org/IMIS/ItemDetail?iProductCode=IR-112A</a>	Traffic control device design and layout	ITE
<i>Designing Walkable Urban Thoroughfares: A Context Sensitive Approach</i> <a href="https://www.ite.org/css/">https://www.ite.org/css/</a>	Context sensitive solutions for major streets	ITE
<i>Traffic Safety Toolbox: a primer on Traffic Safety</i> <a href="http://ecommerce.ite.org/IMIS/ItemDetail?iProductCode=LP-279A">http://ecommerce.ite.org/IMIS/ItemDetail?iProductCode=LP-279A</a>	Traffic Safety	ITE
<i>Roundabouts: An Informational Guide</i> (NCHRP Report 672) <a href="http://www.trb.org/Publications/Blurbs/164470.aspx">http://www.trb.org/Publications/Blurbs/164470.aspx</a>	Roundabouts	TRB
<i>Highway Capacity Manual</i> <a href="http://www.trb.org/Main/Blurbs/175169.aspx">http://www.trb.org/Main/Blurbs/175169.aspx</a>	Multimodal traffic operations evaluation	TRB
<i>Transit Capacity and Quality of Service Manual</i> <a href="http://www.trb.org/Main/Blurbs/169437.aspx">http://www.trb.org/Main/Blurbs/169437.aspx</a>	Transit design	TRB
<i>Proposed Guidelines for Pedestrian Facilities in the Public Right-of-Way</i> (PROWAG) <a href="https://www.access-board.gov/guidelines-and-standards/streets-sidewalks/public-rights-of-way">https://www.access-board.gov/guidelines-and-standards/streets-sidewalks/public-rights-of-way</a>	Pedestrian accessibility	US Access Board
DCAB Interpretive Opinions <a href="http://health.hawaii.gov/dcab/facility-access/interpretive-opinions/">http://health.hawaii.gov/dcab/facility-access/interpretive-opinions/</a>	Pedestrian accessibility	DCAB

<b>Document Title Website</b>	<b>Relevance</b>	<b>Publisher</b>
Traffic Calming Primer <a href="http://www.patnoyes.com/Library/Traffic%20Calming%20Primer.pdf">http://www.patnoyes.com/Library/Traffic%20Calming%20Primer.pdf</a>	Traffic calming toolkit	Pat Noyes and Associates
<i>Hawaii Pedestrian Toolbox: A Guide for Planning, Design, Operations, and Education to Enhance Pedestrian Travel in Hawai'i</i> <a href="http://hidot.hawaii.gov/highways/files/2013/07/Pedest-Tbox-Hawaii-Pedestrian-Toolbox-Low-Res.pdf">http://hidot.hawaii.gov/highways/files/2013/07/Pedest-Tbox-Hawaii-Pedestrian-Toolbox-Low-Res.pdf</a>	Design for pedestrians and Traffic calming toolkit	HDOT
<i>ANSI/IES RP-8-14 Roadway Lighting</i> <a href="https://www.ies.org/store/recommended-practices-and-ansi-standards/roadway-lighting/">https://www.ies.org/store/recommended-practices-and-ansi-standards/roadway-lighting/</a>	Street lighting	Illuminating Engineering Society (IES)
<i>IES DG-21-15 Design Guide for Residential Street Lighting</i> <a href="https://www.ies.org/store/design-guides/design-guide-for-residential-street-lighting/">https://www.ies.org/store/design-guides/design-guide-for-residential-street-lighting/</a>	Street lighting	IES
<i>IES DG-19-08 Design Guide for Roundabout Lighting</i> <a href="https://www.ies.org/store/design-guides/roundabout-lighting/">https://www.ies.org/store/design-guides/roundabout-lighting/</a>	Street lighting	IES
"Informational Report on Lighting Design for Midblock Crosswalks" (Publication No. FHWA-HRT-08-053) <a href="https://www.fhwa.dot.gov/publications/research/safety/08053/">https://www.fhwa.dot.gov/publications/research/safety/08053/</a>	Street lighting for pedestrians	FHWA
"Small Town and Rural Multimodal Networks" (Publication No. FHWA-HEP-17-024) <a href="https://www.fhwa.dot.gov/environment/bicycle_pedestrian/publications/small_towns/fhwahep17024_lg.pdf">https://www.fhwa.dot.gov/environment/bicycle_pedestrian/publications/small_towns/fhwahep17024_lg.pdf</a>	Toolkit for retrofit of existing streets and design treatments	FHWA

## **Environmental Review**

In addition to design standards and guidelines, roadway projects must comply with relevant Federal and State environmental statutes. Projects that are considered “Federal undertakings” must comply with the National Environmental Policy Act (NEPA), the National Historic Preservation Act and other Federal requirements. “Federal undertakings” include projects with Federal funding, and in some cases, projects that require permits from Federal agencies.

County projects must comply with the Hawai‘i Environmental Policy Act (HEPA) as outlined in Hawai‘i Revised Statutes (HRS) Chapter 343.

This manual does not change any of the current practices or policies regarding environmental review and compliance.

## **Other Agency Review**

Along with review by multiple County agencies (such as the departments of Planning, Public Works, Water, Transportation, Police, and Fire) roadway projects are reviewed by other agencies, such as the Department of Health, Hawai‘i Department of Transportation, (HDOT), Disability and Communication Access Board (DCAB), Kaua‘i Island Utility Cooperative (KIUC), and numerous other State and Federal agencies. With the exception of Chapter 5, Transit, this manual does not change the current authority or process for project review by other agencies.

## **Chapter 3: Street Sections**

### **3.1 Street Classifications and Street Typology**

Roadway classification systems are important in that they establish required rights-of-way and design standards based on each road classification. Traditional roadway classification systems are based on evaluating a number of factors, including the following:

- Number of access points (driveways, intersections, etc.),
- Regional vs. local service,
- Speed, and
- Volume

The County's Subdivision Ordinance street requirements (Kaua'i County Code §9-2.3) list five classifications of roadways that were included in the 1972 County Road Standards, as follows:

- Major Thoroughfare,
- Major,
- Collector,
- Minor, and
- Dead-End

In addition to these roadway classifications, Kaua'i County Code §9-2.3 lists right-of-way requirements for streets within Agricultural Subdivisions.

In addition to the County classification system, the Federal Highways Administration (FHWA) has developed a Highway Functional Classification System. This classification system is important as it defines which local roadways may be considered part of the Federal Aid Highway system and as such are eligible for Federal funding through the State Transportation Improvement Program (STIP). The relevant Highway Functional Classifications for Kaua'i include the following:

- Principal Arterial,
- Minor Arterial,
- Major Collector,
- Minor Collector, and
- Local

The County Road Standards state that "Private streets shall conform to the requirements of the public streets."

This Street Design Manual creates a street typology to better define the classifications found in the Subdivision Ordinance. The street typology is based on the factors noted above in traditional classification systems, but also adds the additional consideration of adjacent land use, which was not considered previously. With this additional consideration, roadways will be

designed not just to accommodate desired speeds and volumes of vehicles, but also functionally to support existing and planned adjacent land uses.

Each street under the jurisdiction of the County shall be assigned a Street Classification based on the County Street Classification system found in the Subdivision Ordinance, and a Street Type based on the Street Typology found in this Design Manual. In addition, each County street shall be assigned a Functional Class based on the FHWA Highway Functional Classification System to determine eligibility for Federal Aid Highway funding.

The County of Kaua'i Street Typology is noted in table 3.1.

**Table 3-1. Street Typology**

Name	Definition/Function	Examples	Characteristics
<b>Belt Road</b>	<ul style="list-style-type: none"> <li>•Connects regions and towns</li> </ul>	<ul style="list-style-type: none"> <li>•Kāpule Highway</li> <li>•Kaumuali'i Highway</li> <li>•Kūhiō Highway</li> </ul>	<ul style="list-style-type: none"> <li>•Under HDOT jurisdiction, this manual does not apply</li> </ul>
<b>Major Connector</b>	<ul style="list-style-type: none"> <li>•Connects belt roads to towns, commercial districts, and industrial districts</li> <li>•Serves local and visitor traffic</li> <li>•May carry heavy truck traffic</li> <li>•Fewer access points (driveways)</li> </ul>	<ul style="list-style-type: none"> <li>•Ala Kalanikaumaka</li> <li>•Ala Kinoiki</li> <li>•Kōloa Road (Kaumuali'i Hwy. to Po'ipū Rd.)</li> <li>•Maluhia Road</li> <li>•*Ahukini Road</li> <li>•*Kuamo'o Road (Kūhiō Hwy. to Kamalu Rd.)</li> </ul>	<ul style="list-style-type: none"> <li>•Target Speed: 35-45 MPH</li> <li>•Lanes: 2-3</li> <li>•Traffic Volume: High</li> </ul> <p>*Under HDOT jurisdiction, this manual does not apply</p>
<b>Minor Connector</b>	<ul style="list-style-type: none"> <li>•Connects neighborhoods to commercial districts, major connectors and belt roads</li> <li>•Serves mostly local traffic</li> <li>•More access points (driveways)</li> </ul>	<ul style="list-style-type: none"> <li>•Hau'a'ala Road</li> <li>•Ka'apuni Road</li> <li>•Kīlauea Road</li> <li>•Laipo Road</li> <li>•Mailihuna Road</li> <li>•Ōma'o Road</li> <li>•Papālina Road</li> <li>•Pu'u'ōpae Road</li> <li>•'Ulu Maika</li> <li>•'Umi Street (Rice St. to Ahukini Rd.)</li> </ul>	<ul style="list-style-type: none"> <li>•Target Speed: 20-35 MPH</li> <li>•Lanes: 2-3</li> <li>•Traffic Volume: Medium</li> </ul>
<b>Neighborhood Connector</b>	<ul style="list-style-type: none"> <li>•Serves mostly local traffic</li> <li>•Serves mixed use destinations (residential and/or commercial)</li> <li>•Typically near or connecting to main streets</li> <li>•Sidewalks and on-street parking are required or desired.</li> </ul>	<ul style="list-style-type: none"> <li>•'Akahi Street</li> <li>•Hanalima Street</li> <li>•Hardy Street</li> <li>•Kolo Road</li> <li>•Kukui Street</li> <li>•Lehua Street</li> <li>•'Ulu Street</li> <li>•Waimea Road</li> </ul>	<ul style="list-style-type: none"> <li>•Target Speed: 20-25 MPH</li> <li>•Lanes: 2</li> <li>•Traffic Volume: Low to medium</li> </ul>



<b>Main Street</b>	<ul style="list-style-type: none"> <li>•The main street of towns</li> <li>•Serves through and local functions</li> <li>•Typically found in town cores and village centers</li> <li>•High pedestrian volume</li> </ul>	<ul style="list-style-type: none"> <li>•Hanapēpē Road</li> <li>•Kōloa Road (Po'ipū Rd. to Waikomo Rd.)</li> <li>•Rice Street</li> </ul>	<ul style="list-style-type: none"> <li>•Target Speed: 15-25 MPH</li> <li>•Lanes: 2-3</li> <li>•Traffic Volume: Medium</li> </ul>
<b>Industrial</b>	<ul style="list-style-type: none"> <li>•Serves industry and heavy commercial areas</li> <li>•Services larger vehicles</li> </ul>	<ul style="list-style-type: none"> <li>•Aukele Street</li> <li>•Hālau Street</li> <li>•Haleukana Street</li> <li>•Kīpuni Way</li> <li>•Wa'apā Road</li> </ul>	<ul style="list-style-type: none"> <li>•Target Speed: 25 MPH</li> <li>•Lanes: 2-3</li> <li>•Traffic Volume: Low to High</li> </ul>
<b>Country Road</b>	<ul style="list-style-type: none"> <li>•Serves local traffic</li> <li>•Serves low-density development and agriculture</li> <li>•Serves residential areas R-2 and lower.</li> </ul>	<ul style="list-style-type: none"> <li>•Kahuna Road</li> <li>•Kahiliholo Road</li> <li>•Keālia Road</li> <li>•Wailapa Road</li> <li>•Waipouli Road</li> </ul>	<ul style="list-style-type: none"> <li>•Target Speed 20-25 MPH</li> <li>•Lanes: 2</li> <li>•Traffic Volume: Low to Medium</li> </ul>
<b>Residential Street</b>	<ul style="list-style-type: none"> <li>•Serves residential areas zoned R-4 and higher</li> <li>•Local traffic</li> </ul>		<ul style="list-style-type: none"> <li>•Target Speed: 20 MPH</li> <li>•Lanes: 2</li> <li>•Traffic Volume: Low</li> </ul>

The following table compares the Street Design Manual Street Typology to the Street Classifications found in §9-2.3 of the Kauaʻi County Code. As noted in the table, some of the Street Classifications in the County Code are related to more than one Street Type in the new Typology. For new roads, consultation with the Planning Department and Public Works Engineering Division may be needed to determine which Street Type applies, based on factors such as volume, speed, and adjacent land use.

**Table 3-2. Comparison of Street Typology to County Code Street Classification**

		Street Typology							
County Code Street Classifications		Belt Road N/A	Major Connector	Minor Connector	Neighborhood Connector	Main Street	Industrial	Country Road	Residential Street
	Major Thoroughfare		●			●			
	Major Street			●	●	●	●		
	Collector Street			●	●	●	●	●	
	Minor Street				●		●	●	●
	Dead-end Street						●	●	●
	Ag Street*							●	

\*Agricultural Subdivision Street, per Kauaʻi County Code §9-2.3 (c)(4)

The next table compares the Street Design Manual Typology with the FHWA Highway Functional Classification System.

**Table 3-3. Comparison of Street Typology to FHWA Classifications**

		Street Typology							
FHWA Functional Classifications		Belt Road	Major Connector	Minor Connector	Neighborhood Connector	Main Street	Industrial	Country Road	Residential Street
	Principal Arterial	●	●			●			
	Minor Arterial		●	●		●	●		
	Major Collector			●	●	●	●		
	Minor Collector			●	●	●	●	●	●
	Local				●		●	●	●

Kaua'i County Code §9-2.3 requires the following rights-of-way for each street classification:

<b>Street Classification</b>	<b>Right-of-Way</b>
Major Thoroughfare	Undivided 80' Divided 88'
Major Street	60'
Collector Street	56'
Minor Street	44'
Dead-End Street	40'
Agricultural Subdivision Street	44' 56' feet if longer than 2,000 feet

This Street Design Manual includes the following rights-of-way for the Street Typology (see sections that follow for more detail):

<b>Street Type</b>	<b>Right-of-Way</b>
Major Connector	78'
Minor Connector	58'
Neighborhood Connector	58' 70' with bike lanes
Main Street	70' - 84' (depending on parking configuration)
Industrial Street	58'
Country Road	44'
Residential Street	48'

The County Standard Street Sections shown in this Chapter are intended to provide more detail to the requirements found in the County Code. The County Code only designates street right-of-way width, but does not indicate how the street should be configured. In some instances, the Street Typology right-of-way may vary from the right-of-way requirements in the County Code. The County Code requirements are minimums. Where the Street Typology right-of-way is less than the County Code, the swale, green space at the edge of right-of-way, or planting strip may be widened to achieve the minimum right-of-way in the County Code. If the Street Typology right-of-way exceeds the minimum right-of-way in the County Code, the applicant may use the standard street sections, or may adjust the relevant section to achieve the minimum right-of-way requirement in the County Code. Any adjustments to these Sections shall be subject to the approval of the County Engineer.

Thoroughfare standards in Special Planning Areas included in Kaua'i County Code Chapter 10 shall take precedence over this Street Design Manual and the rights-of-way found in Kaua'i County Code § 9-2.

### 3.2 County Standard Street Sections

The standard street sections are for each Street Type. Some Street Types have more than one section. The selection of a specific section will be based on several factors as noted below:

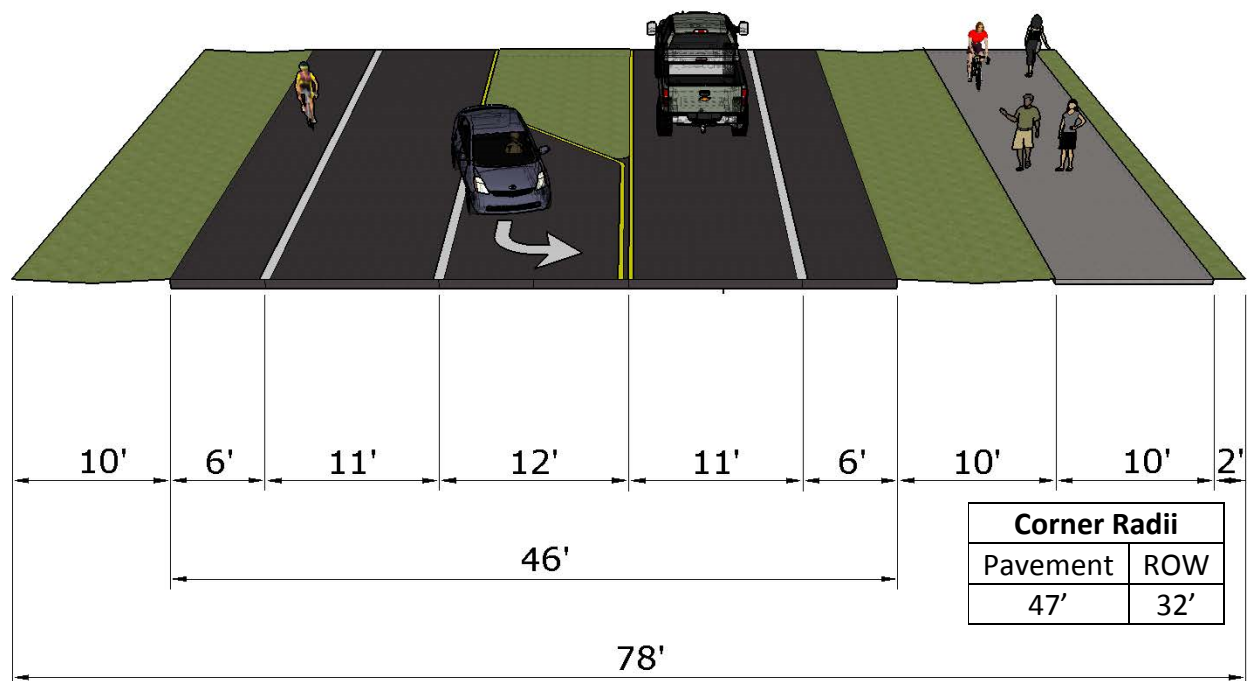
- Sidewalks:** Sidewalks may be required based on other documents, including the County Code, Community Plans, Urban Design/Town Core Plans, Special Planning Area Plans, or community design charrettes. Sidewalk width may also be established in these other documents. In addition, the County Engineer may require sidewalks on other streets if they contribute to overall pedestrian safety and connectivity. Sidewalks may also be required if a condition of development.
- Bicycle lanes:** Bicycle lanes are required if designated in the Bike Hawai'i Plan, Community Plan, Special Planning Area Plan or determined to be needed in a community design charrette. In addition, the County Engineer may require bicycle lanes on other streets if they contribute to overall bicycle connectivity. Bicycle lanes may also be required as a condition of development. For street sections where bicycle lanes are shown as optional, bicycle lanes will generally be required when daily vehicle volumes are or are projected to be 2,000 vehicles per day or greater.
- Parking:** On-street parking has many different configurations. Whether or not on-street parking is required, and the configuration of the parking, will be determined based on County Code, Community Plans, Urban Design/Town Core Plans, Special Planning Area Plans or as a condition of development.
- Drainage:** Curb and gutter may be required in some areas based on County Code or as a condition of development. Where a specific stormwater management system is not required, either curb and gutter or drainage swales may be used, provided that the stormwater management system meets other County standard requirements.
- Turn lanes:** Turn lanes and medians may be required as determined in Community Plans, Town Core/Urban Design plans, community design charrettes, or Traffic Impact Analysis Reports or other traffic studies.
- Intersections:** Intersection treatments are not specifically shown in the design sections but may be designated in Community Plans, Town Core/Urban Design plans, community design charrettes, or as determined in Traffic Impact Analysis Reports or other traffic studies. See Chapter 4 for intersection design reference materials.
- Pedestrian:** Pedestrian crossings are not specifically shown in the design sections but may be designated in Community Plans, Town Core/Urban Design plans, community design charrettes, or as determined in Traffic Impact Analysis Reports or other traffic studies. See Chapter 4 for pedestrian crossing design reference materials.
- Transit:** See Chapter 5 for transit standards.

See the next several pages for County standard street sections. Where roadway sections are provided in Community Plans, Town Core/Urban Design Plans, or Special Area Plans, the sections shown in those documents shall take precedence over the County roadway standard sections. There is not a County standard section for alleys. Sections for alleys shall be considered only if shown in Community Plans, Town Core/Urban Design Plans, or Special Area Plans.

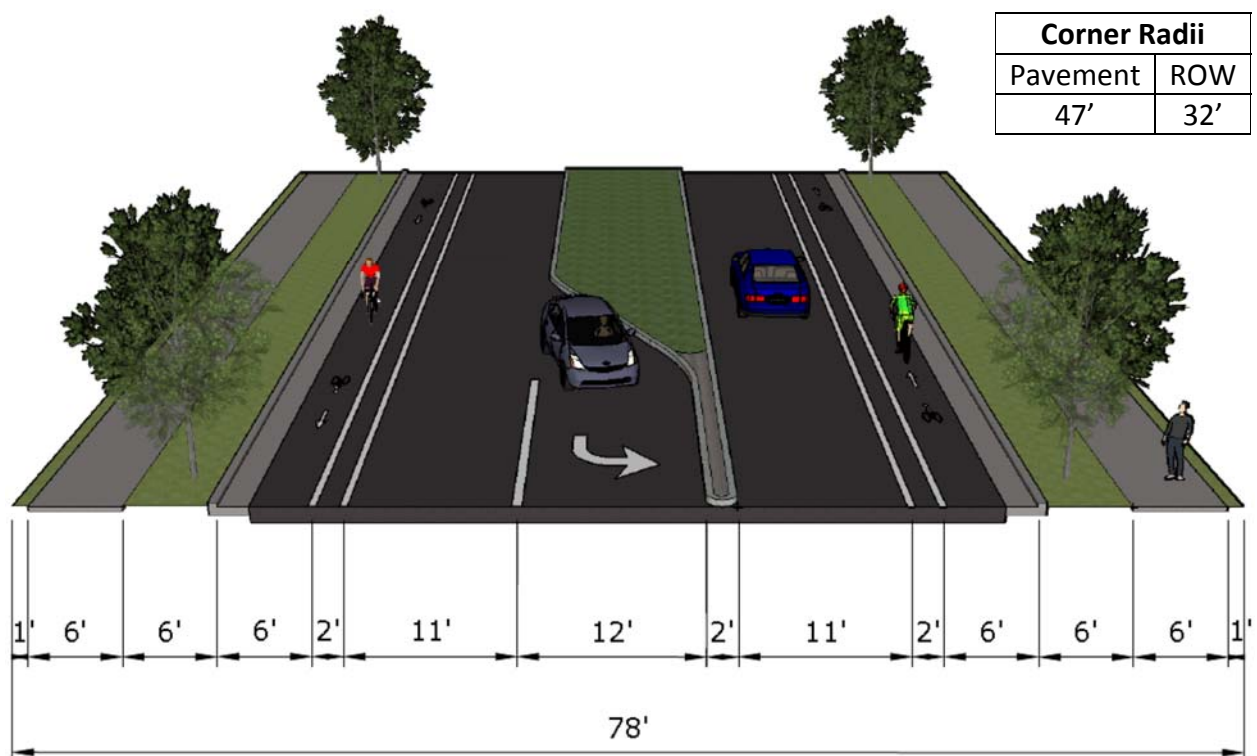
Design concepts developed through a community design process authorized by the Engineering Division of the Department of Public Works may be accepted by the County Engineer.

Due to right-of-way and other limitations, retrofit of existing streets may not be able to comply with the standard sections. In these cases, Department of Public Works will determine the appropriate street section to accommodate all roadway users to the greatest extent feasible, modeled after the street sections in this chapter but adjusted to fit the right-of-way constraints and other limitations. Justification for modified street sections should be documented in a letter or memo to be kept in the project file. See Chapter 7 for community involvement in the street design process.

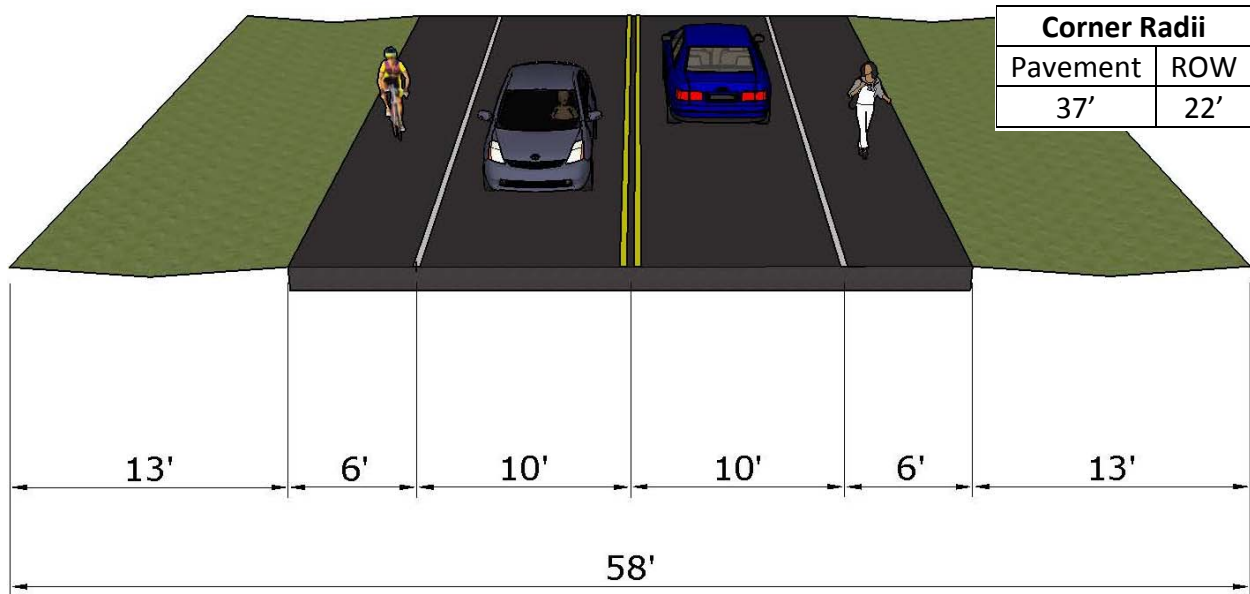
All street designs shall consider how the right-of-way will be used by motor vehicles, bicyclists and pedestrians, and where applicable, transit (see Chapter 5 for transit standards).



**Section Maj-1: Major Connector with shoulders, swales, and shared use path or sidewalk one side**

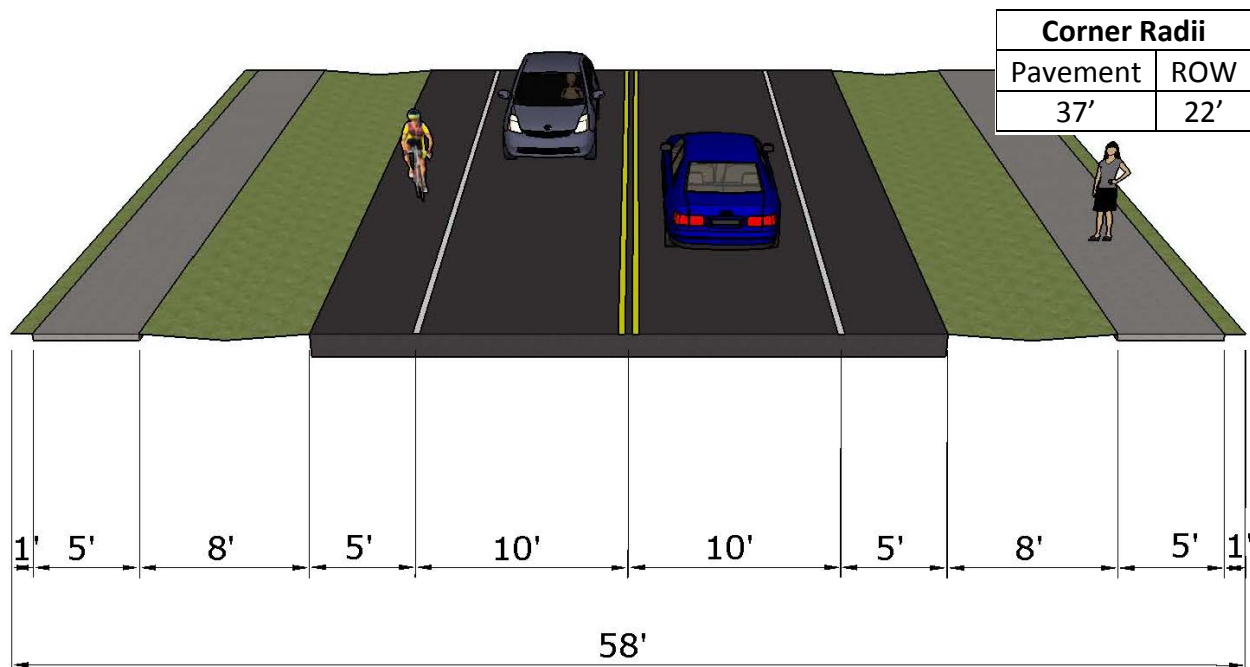


**Section Maj-2: Major Connector with sidewalks, bike lanes and no parking**



**Section Min-1: Minor Connector with shoulders and swales - Centerline where required**

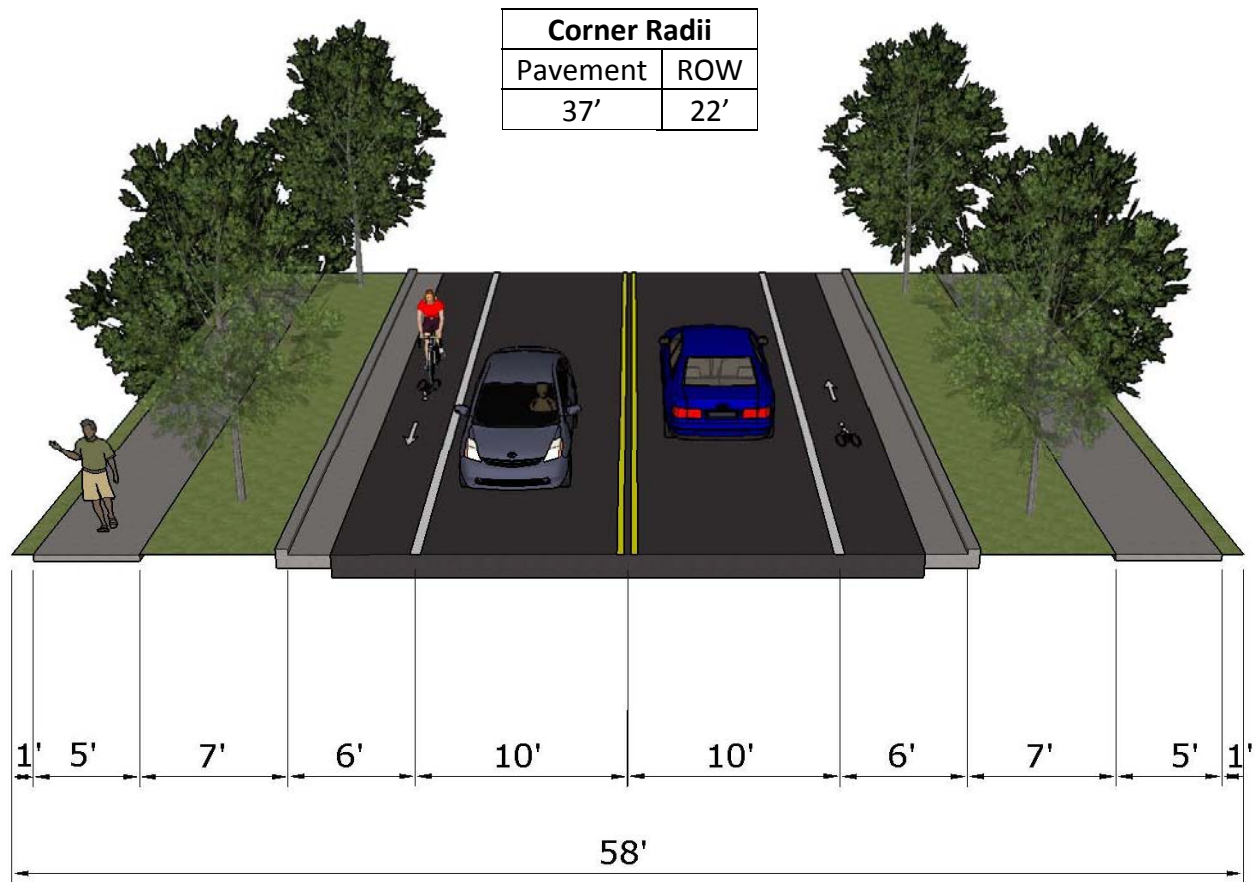
(Where left turn lanes or medians are required, the right-of-way should be widened by 14 feet; see section Maj-2 for left turn lane/median dimensions.)



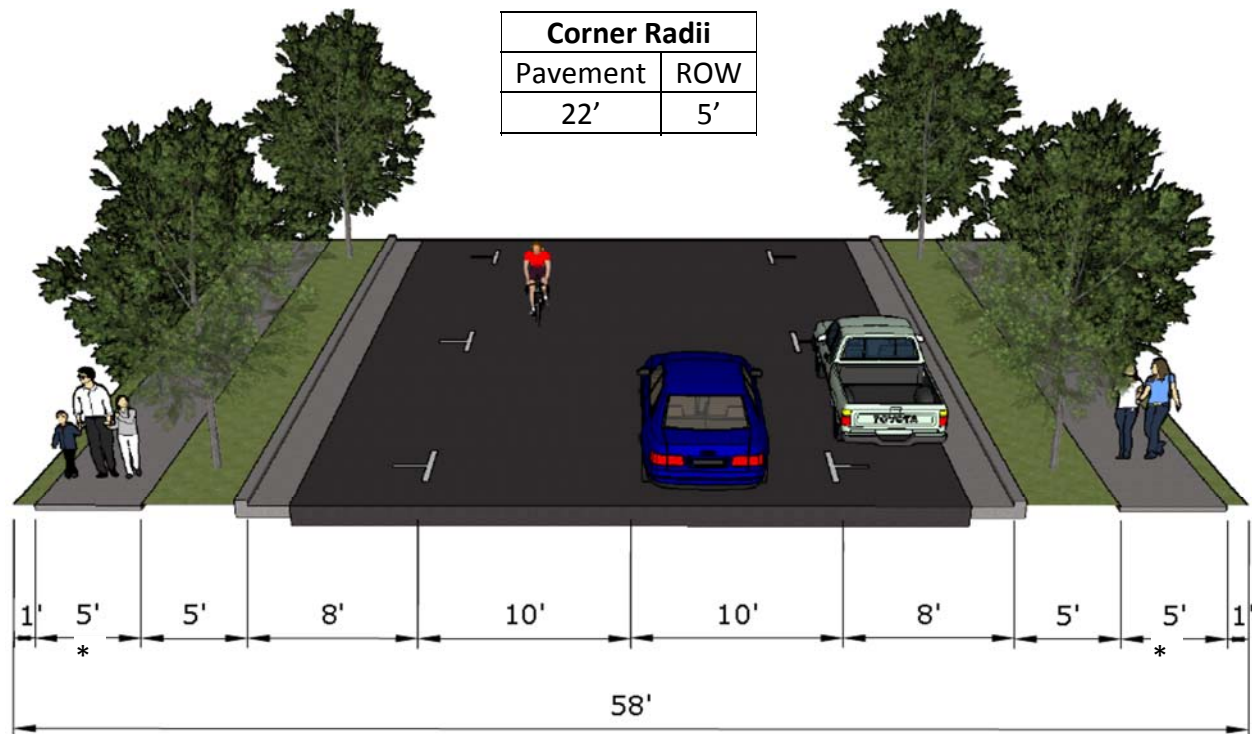
**Section Min-2: Minor Connector with shoulders, swales and sidewalks – Centerline where required**

(Where left turn lanes or medians are required, the right-of-way should be widened by 14 feet; see section Maj-2 for left turn lane/median dimensions.)





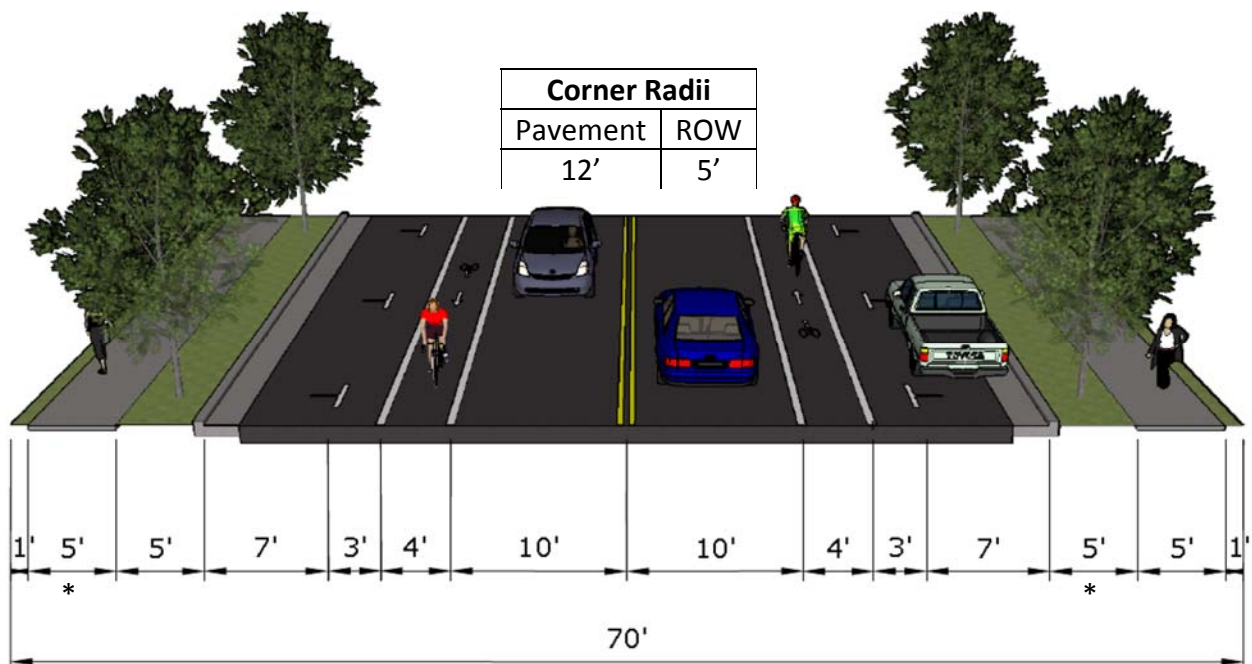
**Section Min-3: Minor Connector with bike lanes and sidewalks - Centerline where required**  
 (Where left turn lanes or medians are required, the right-of-way should be widened by 14 feet; see section Maj-2 for left turn lane/median dimensions.)



### Section NC-1: Neighborhood Connector

Where left turn lanes or medians are used, the right-of-way should be widened by 14 feet; see section Maj-2 for left turn lane/median dimensions.

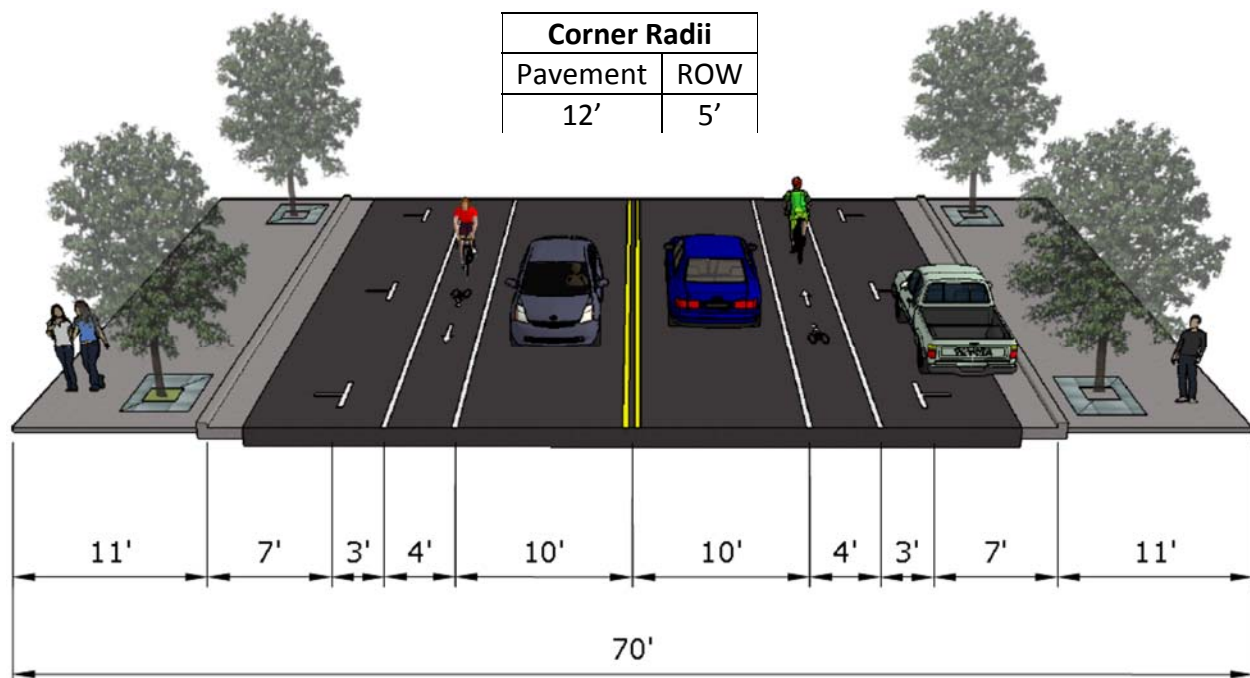
\*In commercial settings, sidewalks should be 6 feet wide with a 4' planting strip



### Section NC-2: Neighborhood Connector with bike lanes

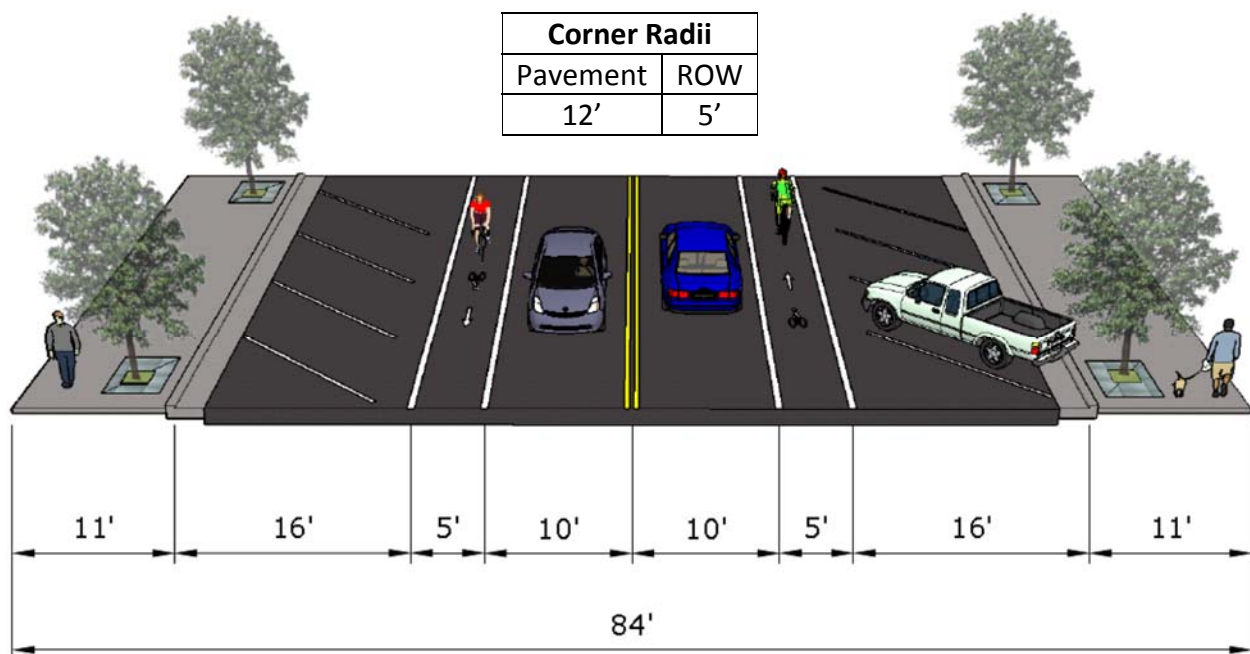
(Where left turn lanes or medians are used, the right-of-way should be widened by 14 feet; see section Maj-2 for left turn lane/median dimensions.)

\*In commercial settings, sidewalks should be 6 feet wide with a 4' planting strip



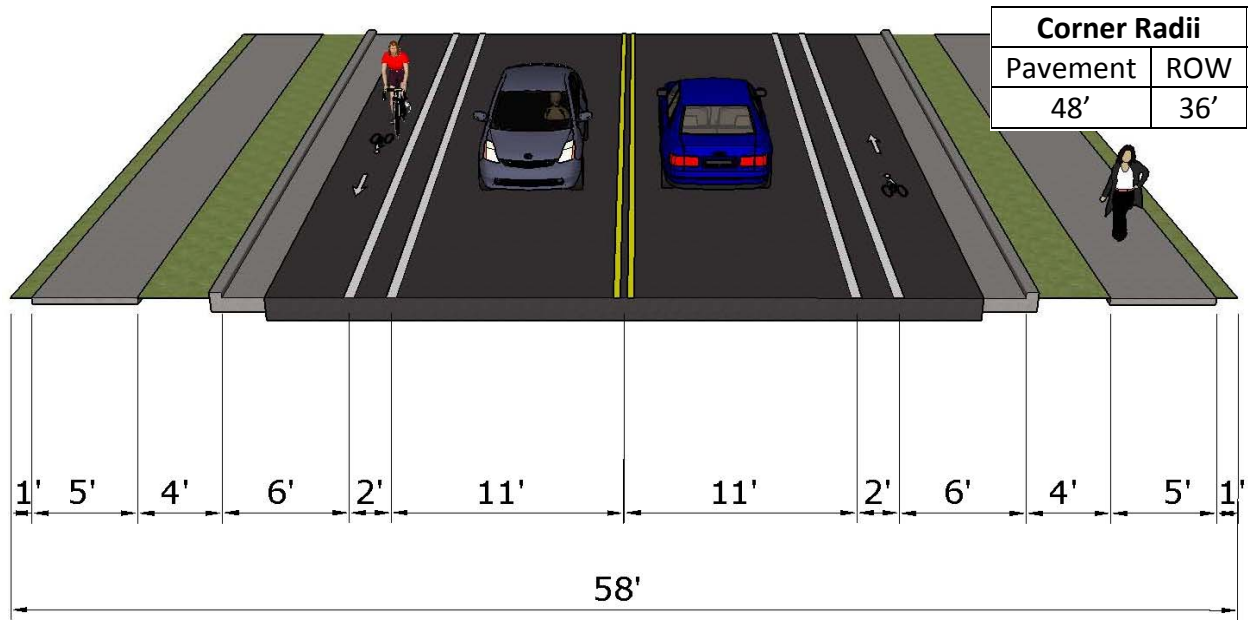
#### Section Main-1: Main Street with parallel parking

(Where left turn lanes or medians are used, the right-of-way should be widened by 14 feet; see section Maj-2 for left turn lane/median dimensions.)



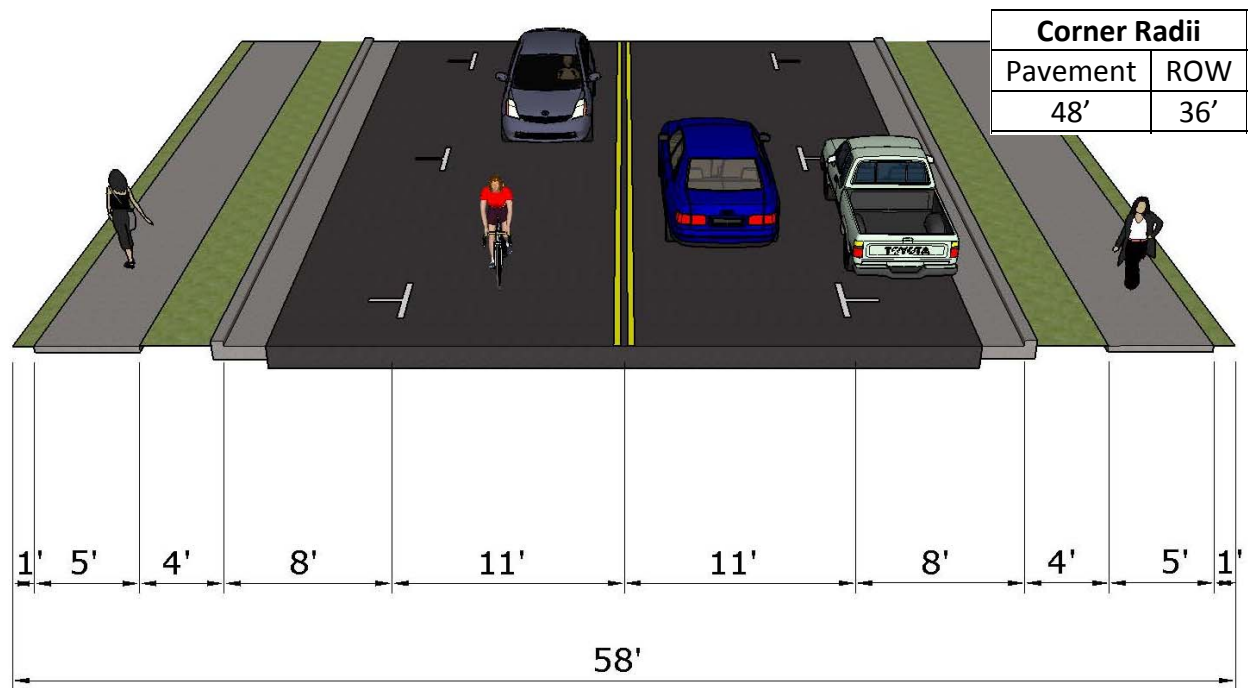
#### Section Main-2: Main Street with head-out 45° diagonal parking

(Where left turn lanes or medians are used, the right-of-way should be widened by 14 feet; see section Maj-2 for left turn lane/median dimensions.)



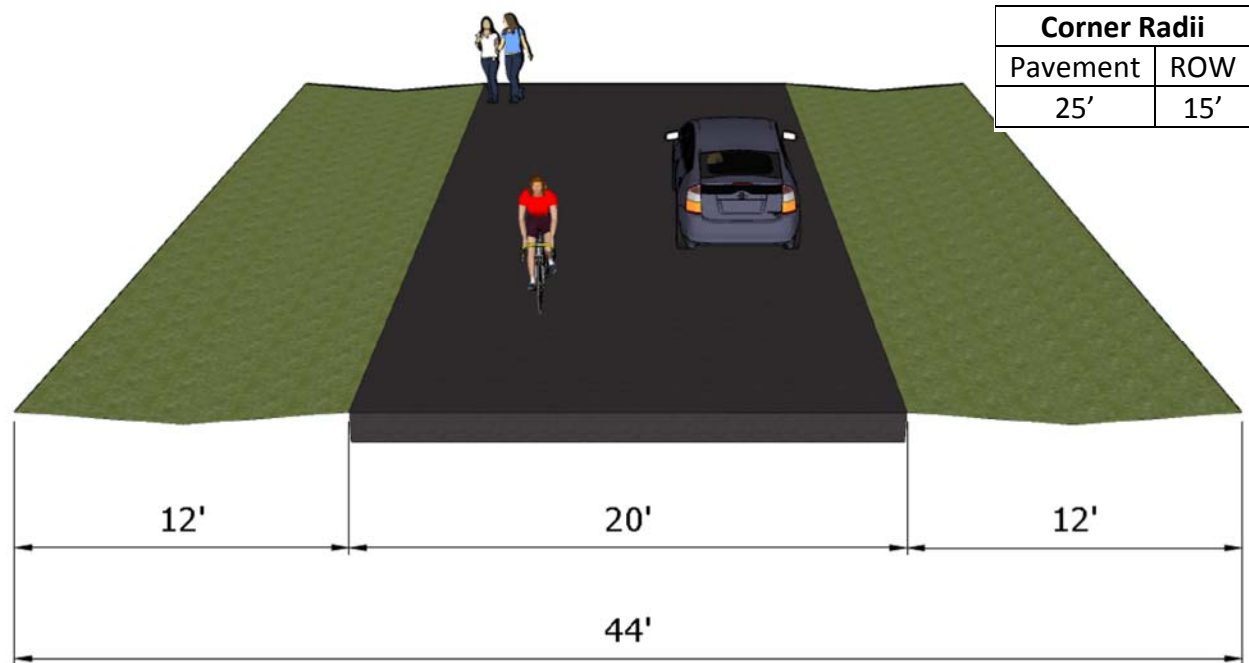
### Section Ind-1: Industrial Street with no parking and bike lane

(Where left turn lanes or medians are used, the right-of-way should be widened by 14 feet; see section Maj-2 for left turn lane/median dimensions.)



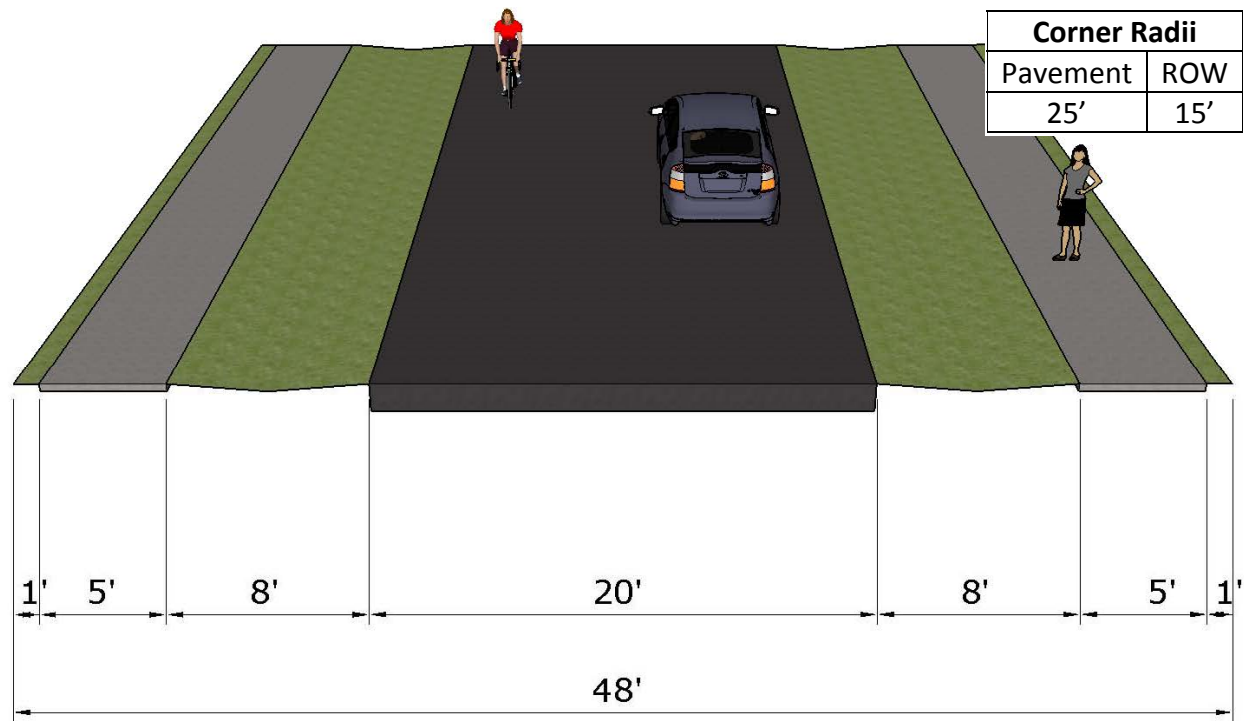
### Section Ind-2: Industrial Street with parking and no bike lane

(Where left turn lanes or medians are used, the right-of-way should be widened by 14 feet; see section Maj-2 for left turn lane/median dimensions.)

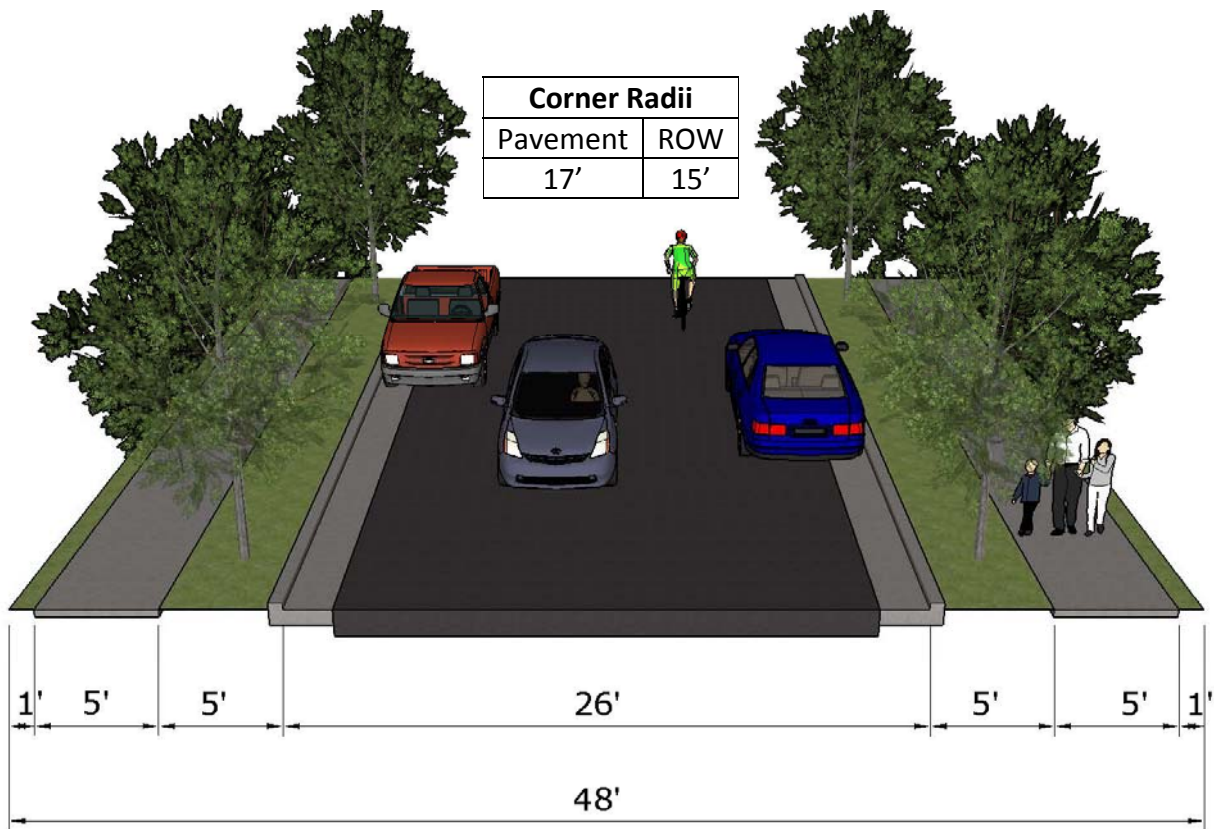


**Section CR-1: Country Road**





**Section Res-1: Residential Street with swale and sidewalk**



**Section Res-2: Residential Street with curb, gutter, and sidewalk**

## Chapter 4 Design Parameters

### 4.1 Design Speed

The selection of a design speed is the single most important choice designers will make because it will influence how people will use the street.<sup>1</sup> Speeds should be reevaluated as development occurs based on the presence of on-street parking, driveways, and adjacent land uses. A maximum speed of 35 mph is recommended in urban areas.<sup>2</sup>

Connectors outside of built-up areas may allow a higher target speed for the roadway. For connections between urban areas, a design speed up to 45 mph may be used if the geometric conditions allow. This speed is appropriate for longer distance trips around the island, especially where a reasonable alternative multimodal facility parallel to the Major Connector exists. Design speeds for highways owned and maintained by the Hawaii Department of Transportation (HDOT) will be determined by HDOT staff.

**Table 4-1 Design Speed Based on Street Typology**

Street Type	Design Speed Flat Terrain	Design Speed Hilly Terrain
Belt road	As determined by HDOT	
Major Connector	45	35
Minor Connector	35	30
Country Road	25	20
Industrial	25	25
Neighborhood Connector	25	20
Main Street	20-25	20-25
Residential Street	25*	20
	* 20 for bicycle boulevards	

Table 1 includes a maximum speed of 45 mph in level terrain for Major Connector and 35 mph and slower for all other streets.

### 4.2 Speed Limits

State law establishes how speed limits should be set. In Hawaii, the maximum speed limit is established by county ordinance for County-owned streets or by the Director of Transportation for State-owned highways. For new streets, the speed limit should initially be set to equal the design speed. For existing streets, speeds should be set using a procedure based on the FHWA Report titled: *Methods and Practices for Setting Speed Limits: An Informational Report*.<sup>3,4</sup> The report is based on NCHRP Report 3-67.<sup>5</sup> Figure 1 summarizes the criteria to identify the appropriate speed limit for a roadway segment.

**Figure 4-1 Speed Limit Setting Criteria**



This method retains the 85th percentile speed as the preferred speed limit in less built up areas. In areas with more potential for conflicts, the posted speed will be lower than the maximum reasonable speed for driving under normal conditions, accounting for increased activity levels. The use of a 50<sup>th</sup> percentile speed reflects the importance and comfort of multimodal users on the street in denser areas.

Speed limits may be lowered from the above criteria based on engineering judgement after considering factors such as the design speed of horizontal curves, vertical curves, and intersection sight distance.

### **4.3 Design Vehicle**

The design of streets and accompanying intersections is influenced by the assumed design vehicle and control vehicle. The design vehicle is what would be expected frequently on a street, making turns from a single lane to one or more receiving lanes. The control vehicle is a worst case scenario and may turn from multiple lanes, and may use opposing traffic lanes or the entire width of the roadway to complete a turn. Allowing the largest infrequent vehicles to use the whole intersection (moving into oncoming traffic lanes when making the turn) results in compact intersections. The compact nature of intersections (tight corner radii, narrower street cross sections, etc.) reduces turning speeds and improves safety for all users, especially pedestrians. Designers should consider removing parking spaces near the intersection or recessing stop lines to open up sight lines and reduce conflicts for large turning vehicles.

Geometric layout of corner radii shall consider the design vehicle for each intersection. The frequently experienced design vehicle should be accommodated without encroachment onto the curb and into opposing traffic lanes. It is generally acceptable for the design vehicle to encroach onto multiple same-direction traffic lanes on the receiving roadway.



**Table 4-2. Design Vehicle based on Street Typology & Travel Speed**

Street Type	Design Vehicle	Control Vehicle
Belt road	Determined by HDOT	Determined by HDOT
Major Connector	WB-50	WB-62
Minor Connector	CITY-BUS	WB-62
Country Road	SU-30*	WB-50
Industrial	WB-50	WB-62
Main Street	DL-23*	WB-50
Neighborhood Connector	DL-23*	WB-50
Residential Street	DL-23	WB-50

\* Along bus routes on these streets, the design vehicle should be the either CITY-BUS for mainline bus routes or SU-30 for shuttle routes, to be determined by the transit agency.

Notes:

1. The WB-50 vehicle approximates a truck pulling a 40-foot container; which is the most common tractor-trailer combination on Kaua'i.
2. The WB-62 vehicle approximates a truck pulling the low-boy trailers that are used to carry heavy equipment on Kaua'i; these truck/trailer combinations are known to be the largest vehicles on Kaua'i.
3. At intersections of two streets of different types, the smaller design vehicle and control vehicle should be used.

#### 4.4 Access Control and Access Management

Access management is the design of access between roadways and land development to reduce conflicts on the roadway system.<sup>6</sup> Access management is accomplished through careful siting of driveways and medians on streets to focus turning traffic at fewer intersections. Access spacing standards are described in Table 4-3. Adjacent commercial properties should be encouraged to share driveways and parking to minimize the number of curb cuts.

**Table 4-3 Access Spacing Standards by Posted Speed**

Speed (mph)	Distance (feet)	Notes
25	100	
30	150	Medians on lower speed facilities for calming
35	200	
40	300	Medians should be considered at speeds >40 MPH
45	350	

Note: This table does not apply to residential streets or country roads.

Medians on streets can be constructed to limit turning movements, reinforce speed limits, provide a location for landscaping and stormwater management, and reduce the potential for crashes. The widths of medians may be as narrow as a 12-inch concrete (or plastic for retrofits) traffic separator to prohibit left turns or crossing movements. Medians must be 6 feet wide to serve as pedestrian refuge islands and wider if street trees or other amenities are desired. At intersections between two connector streets (major and minor), left turn lanes are required on both streets, unless roundabouts are used to control the intersection.

Any deviation or variance from the access management criteria requires an engineering study to be reviewed by County staff. If the street access deviation is adjacent to a state highway, the approval must be coordinated with HDOT prior to resolution of the deviation or variance request. The analysis should

evaluate impacts to the state highway system. When determining the need for and level of detail of an engineering study for a driveway, the following questions should be considered:

- Do the proposed driveway(s) meet the minimum spacing requirements per Table 4-3?
- Will the proposed driveway(s) require modifications to existing lanes?
- Are there any multimodal safety improvement that should be implemented?
- Are there any sight distance or physical obstructions that will result in a safety problem?

#### **4.5 Driveways**

The design of driveways requires a set of width, spacing, and frontage requirements. Driveway requirements depend on the land use and the type of street the driveway is intersecting with. The width of residential driveways should be a minimum of 9 feet and a maximum of 20 feet. Commercial driveways should be a maximum of 35 feet. The spacing of driveways is a function of the site frontage. When more than one driveway will serve a given property frontage, the total width of the driveways shall not exceed 60 percent of the frontage where such a frontage is 100 feet or less. Where the frontage is more than 100 feet, the total driveway width shall not exceed 50 percent of the frontage. Where more than one driveway is necessary to serve any one property, not less than 20 feet of full height curb shall be provided between the driveways.

Where sidewalks exist or will be placed, driveways should be constructed in concrete. Driveways should allow the sidewalk to continue at a consistent elevation and grade where possible and should not compromise the pedestrian experience. Where no sidewalks exist or are planned, the driveway may be either concrete or asphalt pavement. High volume commercial or multi-family residential driveways may be designed similar to street connections with corner radii, when approved by the County Engineer. At these locations, crosswalk markings shall be installed as described in section 4.8.3 of this chapter.

#### **4.6 Sight Distance**

Sight distance is a concept that is used for both highway design and for intersections. Sight distance is most commonly defined as the continuous length of roadway ahead visible to the user. Intersection sight distance is the distance required for a road user without the right of way to perceive and react to the presence of conflicting vehicles and pedestrians. Sight distance is an important issue associated with the safety of intersections, driveways, and other conflict points.<sup>7</sup> It is important to consider sight distance with high speed facilities. The use of sight distance to address where parking and other obstructions will be placed will suggest removal of objects such as street trees and other street furniture. The removal of these items may exacerbate the issues associated with higher speed traffic.

On residential streets and in other slow-speed environments, on-street parking is generally allowed within intersection sight triangles. For residential streets and country roads, parking should be set back a minimum of twenty (20) feet from any marked crosswalk or the prolongation of the right-of-way line of the intersecting street. For all other street types where parking is allowed and the speed limit is twenty-five (25) mph or less, parking setbacks for minor intersections and driveways should be a minimum of 25 feet for sight distance to the right and a minimum of 40 feet for sight distance to the left. For major intersections and driveways, parking may be allowed within intersection sight triangles based on engineering judgment on a case by case basis.

Intersection sight distance for higher speed streets (30 mph and above) should follow the procedures of the AASHTO Green Book.<sup>8</sup> Sight distance calculations using the appropriate Cases A through F for sight distances at intersections are appropriate.

## 4.7 Horizontal and Vertical Alignment

The alignment of roadways establishes the location of the public right-of-way. The horizontal and vertical alignment should provide sufficient sight distance on curves to allow the driver sufficient brake reaction time. Posted speeds may be lower than the design speed because of the limiting radius and other obstructions.

Superelevation and spirals should be used on roadway designs for Major Connectors with design speeds 40 mph and higher. The AASHTO Green Book recommends considering superelevation where curves have “an unacceptable history of curve related crashes.” All other streets have no required superelevation as summarized in Table 4-4.

**Table 4-4. Minimum Radii Streets (No Superelevation) AASHTO Table 3-13b**

Design Speed (mph)	Radius (feet)
15	47
20	99
25	181
30	300
35	454
40	667
45	900

Compound curves should be avoided. Properly designed vertical curves should provide adequate sight distance, safety, good drainage, and a pleasing appearance. The length of vertical curves should be greater than 100 feet and less than one-half mile.

## 4.8 Intersections

Intersection design should facilitate safety, visibility, predictability, and convenience for all users. Safety, efficiency, cost of operation, design context, and current and future users should be considered during intersection design.

New traffic signals or four-way stop controlled intersections are discouraged. Roundabouts are the preferred treatment for intersections that cannot be adequately controlled by one-way or two-way stop control.<sup>9</sup> The Highway Capacity Manual<sup>10</sup> procedures should be used and intersections should be designed for the peak hour of flow rather than peak 15 minutes (use a Peak Hour Factor of 1.0). The Level of Service (LOS) standard for intersections is “E” in town centers and LOS D in less densely populated areas for the peak hour of traffic.

Designers can use a wide range of intersection design elements in combination to provide both operational quality and safety. These include:

- Intersection control treatments such as roundabouts, stop signs, traffic signals, and others;
- Traffic islands to separate conflicting vehicle movements and provide refuge for people walking;
- Full or partial street closures or roadway realignments to simplify the number and orientation of traffic movements through an intersection; and
- Separate turn lanes to remove slow moving or stopped vehicles from through traffic lanes.

The following paragraphs provide a summary of primary intersection design guidelines.

#### 4.8.1 Roundabouts

Modern roundabouts are effective in both safety and efficiency for pedestrians and bicyclists, as well as motor vehicles. Except as described below, a roundabout shall be used at any location where MUTCD signal warrants or all-way stop control warrants are met. Exceptions to this requirement are as follows:

- Where the intersection is immediately adjacent (less than 500 feet) to a coordinated signal system,
- Where a signal will be installed for emergency vehicle access, or
- Where steep terrain or ROW constraints would make construction more expensive or infeasible.<sup>11</sup>

An all-way stop can be used as an interim measure to address safety concerns at an existing two-way (or one-way) stop controlled intersection.

#### 4.8.2 Traffic Signals

New traffic signals shall only be used at locations described in the exceptions above. Traffic signals should include pedestrian crossings at all legs of the intersection.

#### 4.8.3 Pedestrian Crossings

Crosswalks shall be marked on all approaches to intersections that are controlled by a yield sign, stop sign, or traffic signal. Engineering judgment should be used to determine where crosswalks should be marked at uncontrolled intersection approaches and midblock locations, as an important part of the pedestrian network. When marked, crosswalks shall have lines that are longitudinal to the roadway (sometimes called “continental markings”) that are spaced to avoid the wheel paths of vehicles. The NCHRP 562 guidelines<sup>12</sup> should be used to identify when enhanced crossings (median refuge, flashing beacons, and advanced stop lines) will be used.

#### 4.8.4 Angle of Intersection

A right-angle intersection provides the shortest crossing distance for intersecting streets. Intersections should not be skewed more than 15 degrees from a right angle if possible. Skew angles of 60 degrees or less may need geometric countermeasures, such as channelization or other traffic control, such as roundabouts.

#### 4.8.5 Corner Radii and Curb Extensions

Small corner radii keep intersection designs compact and crossing distances short. However, if corner radii are too small, operational problems can occur for larger vehicles. Corner radii for each street type should be as shown on the cross sections in Chapter 3. At the intersection of two streets of different types, the smaller radius will control. The radii should be smaller if there is a bike lane, parking, or other width that provides a larger “effective” radius. Larger radii should only be used if vehicle tracking software or another method shows that a larger radius is necessary for the design vehicle and control vehicle as specified in Section 4.3.

On all curbed streets where parking is allowed, curb extensions (AKA bulbouts) should be used at intersections and marked crosswalks, except on residential streets and industrial streets. For curb extensions at parallel parking the curb should be offset six feet from the normal curb, and for curb extensions at 45° diagonal parking the curb should be offset 13 feet from the normal curb. Corner radii

shown in Chapter 3 have been calculated on these curb extension dimensions. Where curb extensions are used, consideration should be given to sloping the surface of the parking area toward the center of the road with a valley gutter located in line with the gutter at the curb extensions.

## 4.9 Traffic Control Devices

Traffic control devices are defined as all signs, signals, markings, and other devices used to regulate, warn, or guide motorized and non-motorized traffic. All traffic control devices placed on or adjacent to County streets, pedestrian facilities, or bicycle facilities shall be in substantial conformance with the standards and guidelines within the latest edition of the Manual on Uniform Traffic Control Devices (MUTCD).

### 4.9.1 Center Line Markings

Center line markings shall be placed on County streets at locations identified in Table 4-6. In addition, center line markings should be placed on other streets where an engineering study indicates such a need. Center line markings shall be used on any street or portion of a street with three or more lanes for moving motor vehicle traffic, including turn lanes. Where center line markings are used, solid double yellow markings indicating no passing zones shall be used, except that passing zone markings may be used on major connectors and minor connectors where an engineering study has determined that available sight distance and other features allow for passing zones (See MUTCD Section 3B.02). Where an engineering study indicates a need for two way left turn lane, two-way left turn lane markings may be used instead of double yellow markings.

**Table 4-5 Center Line Markings**

<b>Street Type</b>	<b>Average Daily Traffic Volume (ADT)</b>	<b>Center Line Marking Requirement</b>
<b>Major Connector</b>	<b>All Volumes</b>	<b>Continuous center line, median, or turn lane</b>
<b>Minor Connector or Neighborhood Connector</b>	<b>ADT &gt; 3,000</b>	<b>Continuous center line</b>
	<b>1,000 &lt; ADT &lt; 3000</b>	<b>Center line for 50 feet approaching all intersections and at horizontal and vertical curves that restrict sight distance</b>
	<b>ADT &lt; 1,000</b>	<b>Center line for 50 feet approaching all intersections</b>
<b>Country Road</b>	<b>ADT &gt; 1,000</b>	<b>Center line for 50 feet approaching all intersections</b>
	<b>ADT &lt; 1,000</b>	<b>Center line for 50 feet approaching stop signs</b>
<b>Industrial</b>	<b>All Volumes</b>	<b>Continuous center line</b>
<b>Main Street</b>	<b>All Volumes</b>	<b>Continuous center line</b>
<b>Residential Street</b>	<b>All Volumes</b>	<b>Center line for 50 feet approaching stop signs</b>

### 4.9.2 Edge Line and Bicycle Lane Markings

The following standards and guidelines apply to edge line markings:

- Edge line markings shall be used on all uncurbed major connectors and other uncurbed roadways with average daily traffic of 6,000 vehicles per day or greater.
- Edge line markings should be used on all other uncurbed roadways with average daily traffic of 3,000 vehicles per day or greater.

- Where bicycle lanes are marked, the bicycle lane line provides the necessary delineation of the traveled way for motor vehicle traffic; edge line markings on the outside of the bicycle lanes are not necessary.
- Bicycle lanes should be marked with white lines that are six (6) inches wide and the helmeted bicyclist symbol shown in Figure 9C-3B of the MUTCD. Bike lane signs are not necessary to supplement bicycle lane markings, and should generally be avoided to reduce sign clutter.
- Raised pavement markings should not be used to supplement edge lines or bicycle lane lines.

#### 4.9.3 Stop Lines

The following guidelines shall be applied for the installation of stop lines.

- Stop lines shall be used to supplement all stop signs and traffic signals. Stop lines should normally be placed 5 feet in advance of crosswalks at stop signs and traffic signals.
- Stop lines should be used in advance of marked crosswalks at uncontrolled locations, as follows:
  - For approaches to crosswalks with only one through lane, stop lines should be placed 10 feet in advance of the crosswalk markings. If there is a two-way left turn lane or dedicated left turn lane adjacent to the single lane, then the stop line should be extended across the left turn lane. Stop lines should be placed further in advance of crosswalks if placement at 10 feet would result in the stop line being placed in the middle of an intersection.
  - For approaches with more than one through lane in the same direction, stop lines should be placed 20 to 50 feet in advance of the crosswalk markings (30' preferred), along with STOP HERE FOR PEDESTRIANS (R1-5) signs.
  - Stop lines should not be used in advance of crosswalks at roundabouts.
- Except at locations where stop lines are required or recommended above, stop lines shall not be used within left turn lanes.

#### 4.9.4 Rectangular Rapid Flashing Beacons

Rectangular Rapid Flashing Beacons (RRFBs) are used to provide active warning to motorists that pedestrians are crossing at marked crosswalks. If overused, RRFBs could potentially lose their effectiveness. RRFBs should be reserved for use on higher volume, and/or higher speed streets. The following guidelines should be used for selection of locations for installation of RRFBs.

- RRFBs shall only be used at marked crosswalks.
- RRFBs should not be installed on residential streets.
- RRFBs should not be installed on other streets with less than 2,000 vehicles per day, except within school zones, based on engineering judgement.
- At crosswalks where the crossing distance is greater than 36 feet, every effort should be made to install a raised median to provide a location for flashing beacons can be installed.
- RRFBs shall not be installed on stop- or signal-controlled approaches.
- RRFBs are generally not necessary for single-lane roundabout entrances and exits, due to slow speeds, the short crossing distance, and the presence of a median for pedestrian refuge.

## 4.10 Traffic Calming

Traffic calming is the use of physical measures that reduce traffic speeds to create safer, more comfortable streets for residents and users. Traffic calming measures are intended to be self-enforcing changes to reduce traffic speeds.<sup>13</sup> The three categories of speed control measures are: vertical measures, such as speed humps or speed cushions to make higher speeds less comfortable for drivers; horizontal measures, which require lower speeds to navigate; and narrowing measures, which use a sense of enclosure to discourage speeding. Traffic calming is often implemented as a retrofit to a street, in conjunction with other changes.<sup>14</sup> Traffic calming may also be employed on bicycle boulevard projects that promote connectivity for bicyclists.

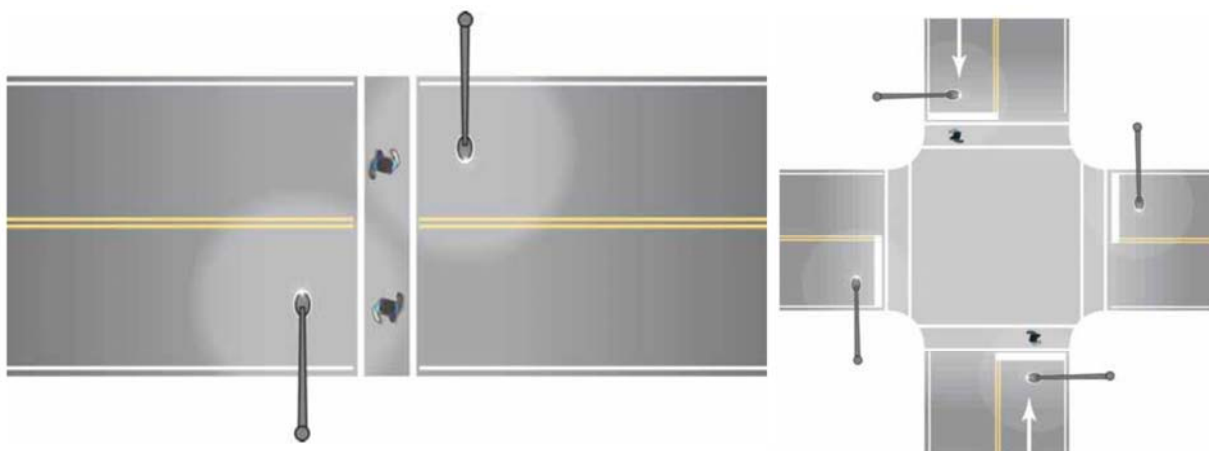
## 4.11 Street Lighting

Street lighting is a key organizing streetscape element that defines the nighttime visual environment in urban settings. Lighting design should assess conditions for vehicular traffic and pedestrians on sidewalks. On streets with lots of trees, street lighting scaled to pedestrians (low lights) illuminates the sidewalk even after the trees grow larger. Lighting can also be helpful along streets adjacent to the school grounds to minimize school vandalism and improve security. Transit stops benefit from both kinds of lighting: illumination of the travel way for safer walking conditions, and illumination at the stop or shelter for security.

The design of all lighting systems should be in conformance with the National Electrical Code, the National Electrical Safety Code, and Hawaii State Electrical Code. Luminaires shall be Light Emitting Diode (LED); weatherproof aluminum housing and should have zero up light and shall be consistent with mitigation and conservation plans for protection of endangered species. The mounting height will vary depending on the adjacent utility poles, wattage of the street light, adjacent land use, and the spacing between poles. Street lights on Kauaʻi that are connected to the power grid are maintained by the Kauaʻi Island Utility Cooperative (KIUC). Therefore, all street lights shall meet the current requirements of KIUC. The provision of lighting should be carefully weighed with concerns from the community.

### 4.11.1 Crosswalk lighting

Marked crosswalks should have street lights that illuminate the pedestrian from all sides that motor vehicles may approach. Crosswalk lighting should meet the guidance provided in the Informational Report on Lighting Design for Midblock Crosswalks.<sup>15</sup>



Typical crosswalk illumination placement

#### 4.11.2 Roadway lighting

Streetlights should be installed at intersections, cul-de-sacs, and at 400 feet intervals in new residential subdivisions. Streetlights should be installed be activated at intersections, cul-de-sacs, and at 300 feet intervals in new commercial or industrial subdivisions. Illuminating Engineering Society of North America (IESNA), *Roadway Lighting, RP-8-14* contains design criteria for street lighting.<sup>16</sup> Alternatives to this spacing may be considered by the County Engineer, based on a lighting study.

#### 4.12 References

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- <sup>1</sup> Timothy R. Neuman et al., *A Guide to Best Practices for Achieving Context Sensitive Solutions*, NCHRP Report 480 (Washington, D.C.: Transportation Research Board, 2002), [http://onlinepubs.trb.org/onlinepubs/nchrp/nchrp\\_rpt\\_480.pdf](http://onlinepubs.trb.org/onlinepubs/nchrp/nchrp_rpt_480.pdf).
- <sup>2</sup> National Association of City Transportation Officials, *Urban Street Design Guide*, 2nd edition (Washington: Island Press, 2013), <http://nacto.org/publication/urban-street-design-guide/>.
- <sup>3</sup> "USLIMITS2," *Federal Highway Administration - Safety*, October 15, 2014, <https://safety.fhwa.dot.gov/uslimits/>.
- <sup>4</sup> Gerald J. Forbes et al., "Methods and Practices for Setting Speed Limits: An Informational Report" (Washington, D.C.: Federal Highway Administration, April 2012), [https://safety.fhwa.dot.gov/speedmgt/ref\\_mats/fhwasa12004/](https://safety.fhwa.dot.gov/speedmgt/ref_mats/fhwasa12004/).
- <sup>5</sup> Raghavan Srinivasan et al., "Expert System for Recommending Speed Limits in Speed Zones," Final Report (National Cooperative Highway Research Program, 2006), <https://pdfs.semanticscholar.org/d963/4291fbca0b0497310da5af9b4b00f38479fe.pdf>.
- <sup>6</sup> David C. Rose, *A Guidebook for Including Access Management in Transportation Planning* (Washington, D.C.: Transportation Research Board, 2005).
- <sup>7</sup> "Clear Sight Triangles on Stop- or Yield-Controlled Approaches to Intersections" (Federal Highway Administration, 2/08), [https://safety.fhwa.dot.gov/intersection/other\\_topics/fhwasa08008/uc1\\_clear\\_sight\\_triangles.pdf](https://safety.fhwa.dot.gov/intersection/other_topics/fhwasa08008/uc1_clear_sight_triangles.pdf).
- <sup>8</sup> *A Policy on Geometric Design of Highways and Streets*, 6th ed. (Washington, D.C.: American Association of State Highway and Transportation Officials, 2011).
- <sup>9</sup> *Roundabouts: An Informational Guide*, 2nd ed., NCHRP Report 672 (Washington, D.C.: Transportation Research Board, 2010), 3–32, <https://www.nap.edu/catalog/22914/roundabouts-an-informational-guide-second-edition>.
- <sup>10</sup> *Highway Capacity Manual*, 6th ed., 4 vols. (Transportation Research Board, 2016), <http://trrjournalonline.trb.org/doi/book/10.5555/9780309441483>.
- <sup>11</sup> "Chapter 5 - Basic Design," in *Highway Design Manual* (New York: New York State Department of Transportation, 2011), 5–95, <https://www.dot.ny.gov/divisions/engineering/design/dgab/hdm/chapter-5>.
- <sup>12</sup> Kay Fitzpatrick et al., *Improving Pedestrian Safety at Unsignalized Crossings*, NCHRP Report 562 (Washington, D.C.: Transportation Research Board, 2006), [doi:10.17226/13962](https://doi.org/10.17226/13962).
- <sup>13</sup> "Hawaii Pedestrian Toolbox: A Guide for Planning, Design, Operations, and Education to Enhance Pedestrian Travel in Hawaii," Hawaii Statewide Pedestrian Master Plan (Honolulu: Hawaii Department of Transportation, May 2013), 2-15–18, <https://hidot.hawaii.gov/highways/files/2013/07/Pedest-Tbox-Hawaii-Pedestrian-Toolbox-Low-Res.pdf>.
- <sup>14</sup> Reid Ewing, *Traffic Calming: State of the Practice* (Washington, D.C.: Institute of Transportation Engineers, 1999), <http://www.ite.org/traffic/tcstate.asp>.
- <sup>15</sup> Ronald B. Gibbons et al., "Informational Report on Lighting Design for Midblock Crosswalks" (McLean, VA: Federal Highway Administration, April 2008), <https://www.fhwa.dot.gov/publications/research/safety/08053/>.
- <sup>16</sup> *ANSI/IESNA RP-8-14 American National Standard Practice for Roadway Lighting* (Illuminating Engineering Society, 2014).



## **Chapter 5: Transit**

The County's Transportation Agency operates the Kaua'i Bus. The following guidelines shall be used for the routing of project applications to the Transportation Agency for review and comment.

### *Planning Department*

Zoning permit applications for the following types of projects shall be routed to the Transportation Agency prior to conditions of development being reviewed and approved by the Planning Commission or the Planning Department:

- Projects fronting an existing bus route,
- Projects on a proposed bus route as identified in planning documents such as Community Plans,
- Schools,
- Parks of 2 acres or greater,
- Senior housing projects with four units or more,
- Housing projects with 8 units or more,
- Commercial projects with a minimum of 10,000 sf of building space,
- Medical projects with a minimum of 5,000 sf of building space,
- Industrial projects with a minimum of 10,000 sf of building space, and
- Resort projects

### *Department of Public Works Engineering Division*

All grading permit applications shall be routed to the Transportation Agency.

All County road projects shall be routed to the Transportation Agency at the scoping and conceptual design phase. All 35% plans shall be routed to the Transportation Agency. Additional phases may be submitted to the Transportation Agency depending on the scope of the project.

## **Transit Design Guidelines**

Where transit facilities are required, they shall be designed based on the *County of Kaua'i Transit Design Guidelines*.



## Chapter 6: Landscape

### Hawaiian Plants

Consistent with the Hawaiian Plants Act (HB 206), Hawaiian plants shall be considered for street landscaping. "Hawaiian plants" means any endemic or indigenous plant species growing or living in Hawaii without having been brought to Hawaii by humans; or any plant species brought to Hawaii by Polynesians before European contact.

### Non-Invasive

Selected materials shall be non-invasive. Invasive materials that are prohibited include those listed in "Hawai'i's Most Invasive Horticultural Plants", <http://www.hear.org/hortweeds/>.

### Street trees

Street trees shall be provided where shown in the standard sections, or as designated in planning documents and community design charrettes. Street trees shall be selected based on a number of criteria:

- Branching habit – trees shall not have brittle branches subject to falling in light winds. The natural growth pattern of selected trees will allow for pedestrian and vehicle clearance.
- Roots – trees shall not have invasive root systems prone to uplifting of pavements and sidewalks.
- Mature size – trees shall be selected based on appropriate size at maturity, taking into account both available width and height. For example, trees may be planted under overhead utility lines provided that the mature height will not interfere with the utility lines.
- Fruits/nuts – trees shall not have large fruits or nuts that may cause a slippery condition for pedestrians or other hazard
- Regionally appropriate – trees shall be selected for their tolerance of the microclimate in which they will be planted, taking into account elevation, exposure to wind and sea spray, sun/shade, rainfall, drought tolerance, soil type etc.

Street tree spacing will vary based on available planting areas, adjacent land uses, utility poles and other obstructions, and tree width at maturity. Where on-street parking is adjacent, street trees shall be aligned with parking striping. Street tree placement will also take into account adjacent building entrances, signage and other features. The following average spacing is a recommendation, but may be adjusted based on site conditions.

Street Section	Description	Average Street Tree Spacing
Maj-2	Major Connector with sidewalks, bike lanes, and no parking	50-100 feet
Min-3	Minor Connector with bike lanes and sidewalks	40-70 feet

NC-1, 2	All Neighborhood Connectors	40-70 feet
Main-1, 2	All Main Streets	40-70 feet
Res-2	Residential Street with curb, gutter and sidewalk	40-70 feet

Street trees shall also be planted based on the following minimum distances:

Driveway apron – 5 feet

Intersection curb line – 25 feet

Water mainline – 5 feet (may be greater depending on depth and material of waterline)

Fire hydrant – 10 feet

Stop or yield signs – 20 feet

Utility pole – 10 feet

Street trees may be planted in linear planting strips between the sidewalk and curb, or in tree wells as shown in the standard sections. Tree wells are required in areas where heavy pedestrian traffic is anticipated, such as main streets. Tree wells are also encouraged where on-street parking with heavy turnover is anticipated, such as commercial districts. Where tree wells are used, the minimum dimension of the tree well shall be 15 square feet. Tree well dimensions may be reduced if structural soil or some other medium that allows root growth and still provides structural base requirements is used under the sidewalk. Compacted soil is not considered structural soil. Tree wells shall have metal or concrete grates on main streets and belt roads in town cores, and on other streets where required in planning documents or through design charrettes.

For tree planting in medians, the minimum median width shall be five feet from back of curb.

Where tree wells are used, root barriers are required, unless structural soil or porous pavements are used adjacent to the tree well. Root barriers are also required in linear planting strips and medians where the center of the tree is five feet or less from the edge of sidewalk, curb, or paving.

### **Ground covers and shrubs**

Ground covers and shrubs may be used in parkway strips and medians. Where planting strips are adjacent to on-street parking, either grass or pavers shall be used to allow passengers from parked cars to access the sidewalk. Ground covers and shrubs shall be selected based on the following criteria:

- Width and height at maturity – plant size at maturity shall not require extensive pruning or hedging.
- Regionally appropriate – ground covers and shrubs shall be selected for their tolerance of the microclimate in which they will be planted, taking into account elevation, exposure to wind and sea spray, sun/shade, rainfall, drought tolerance, soil type etc.

- Where feasible and appropriate, ground covers and shrubs shall be indigenous to the County of Kauaʻi, or be species brought to Hawaiʻi before European contact.
- When established, ground covers and shrubs should minimize weed growth.

Plant selection and placement shall maintain visibility and site lines. Shrubs higher than three feet shall not be used in planting strips between curb and sidewalk.

### **Irrigation**

Permanent irrigation is required for trees, medians and planting strips between curb and sidewalk for the following Street Types: Main Street, Neighborhood Commercial, and Industrial. Trees shall be irrigated with a deep watering system (bubblers or drip system reaching the root zone) on separate valves from other irrigation. In-line drip irrigation is encouraged for ground cover and shrub areas; spray irrigation is encouraged for grass areas. Where spray irrigation is used, overspray on to adjacent sidewalks and pavement shall be minimized.

### **Landscape Maintenance**

Strategies for landscape maintenance may vary depending on location and may include the following:

- Maintenance by adjacent property owners
- Maintenance by a District, such as a Landscape District or Business Improvement District
- Maintenance by a Community Association or Homeowners Association
- Maintenance by volunteers, such as an Adopt a Street program
- Maintenance by the County

The appropriate maintenance strategies shall be reviewed by the County for each roadway during design.



## **Chapter 7: Community Involvement in the Design Process**

### **Purpose of Community Involvement**

The purpose of community involvement is to have timely and meaningful dialog with community members about a proposed project. This may include education regarding established County goals, policies and standards, as well as input about goals and design concepts at key points during the process. The extent of the community involvement effort will vary depending on the complexity and significance of the project.

### **Community Involvement Plan**

Projects involving new roadways and/or reconfiguration of existing roadways shall have a community involvement plan. The community involvement plan will identify the type, extent, and schedule of community involvement to be incorporated into the project.

The community involvement plan should be based on one of the following levels of desired engagement:

- Inform: community members are informed about the project but aren't actively involved in the process.
- Consult: the public is asked to provide feedback on analyses, alternatives, and decisions.
- Involve: feedback loops allow community members to influence multiple stages or drafts of the project.
- Collaborate: the public is a partner in each phase of the decision-making process and provides direct advice on solutions.

### **Community Involvement Toolbox**

A variety of outreach methods and tools can be used to achieve the community outreach plan, from traditional community meetings to online engagement. A variety of methods is desirable to achieve diverse community representation, including all ages and income levels. Different types of engagement may occur at different times in the process, and may include the following:

- Community meetings, workshops and open houses
- Focus groups (a select group of individuals that represents a distinct interest group)
- Development of a stakeholder group or advisory committee
- Design charrettes – intensive three-five day community design workshops that typically start with a “blank slate” and end with a concept design
- Attendance at established meetings held by other organizations (PTSA's, schools, church groups, neighborhood associations, business groups, clubs, etc.)
- Press releases, mailings, flyers, advertisements
- Use of social media, websites and crowdsourcing
- Telephone and online surveys
- Commission and Council meetings and public hearings

**Partnering with Other Agencies and Organizations**

In some cases, community outreach can be more successful when other agencies or organizations help get the word out and/or host meetings and events. This approach should also be considered as a part of the community involvement plan.